

ABSTRACT

The projection optical system, includes:

a lens component formed of fluorite;

a lens component formed of quartz;

5 a first lens group including at least one lens component formed of fluorite and having a positive refractive power;

a second lens group arranged in an optical path between the first lens group and the second surface and having a negative refractive power; and

10 a third lens group arranged in an optical path between the second lens group and the second surface and having a positive refractive power;

15 wherein when the number of the lens components formed of quartz is  $S_{num}$ , the number of the lens components formed of fluorite is  $C_{num}$ , and a numerical aperture of the second surface side of the projection optical system is  $NA$ , the following conditions are satisfied:

20  $S_{num} > C_{num}$  (1)

$NA > 0.75$  (2).